Operating instructions
Thermo Scientific Barnstead Smart2Pure Water Purification System

[ ] **Art. no.: 50129869 (3 Standard)**
[ ] **Art. no.: 50129870 (3 UF)**
[ ] **Art. no.: 50129872 (3 UV)**
[ ] **Art. no.: 50129688 (3 UV/UF)**
[ ] **Art. no.: 50129873 (6 Standard)**
[ ] **Art. no.: 50129874 (6 UF)**
[ ] **Art. no.: 50129885 (6 UV)**
[ ] **Art. no.: 50129887 (6 UV/UF)**

Serial no.: .....

Avoid misuse! Read these instructions prior to installation and start-up!

50129848; Stand: 04.12

EC Declaration of Conformity

according to EC Machines Directive 2006/42/EG, Appendix II A

We herewith declare that the design and construction of the machine named below and the types of it that we have introduced into the market conform to the fundamental safety and health requirements of EC Directive 2006/42/EC.
This declaration loses its validity when changes which were not agreed to by us are made to the machine.

Manufacturer: Thermo Electron LED GmbH
Robert-Bosch-Straße 1
D-63505 Langenselbold
Germany

Description of the machine:

Function: Ultra pure water system

Types: Smart2Pure 3, Smart2Pure 3 UV, Smart2Pure 3 UF, Smart2Pure 3 UV/UF
Smart2Pure 6, Smart2Pure 6 UV, Smart2Pure 6 UF, Smart2Pure 6 UV/UF

Article nos.: 50129869, 50129870, 50129872, 50129688
50129873, 50129874, 50129885, 50129887

We also declare that the product complies with the following applicable Guidelines/Directives:
Electromagnetic Compatibility Directive (2004/108/EG)

Harmonized standards applied:

DIN EN ISO 12100-1 Safety of machines, Part 1: Principles
DIN EN ISO 12100-2 Safety of machines, Part 2: Technical Guidelines
DIN EN ISO 14121-1 Safety of machines, Part 1: Risk Assessment
DIN EN 61326-1

Authorized person for documentation:

Detlef Opp
Stockland 3
D-56412 Niederelbert

Niederelbert, 1 April 2011

Detlef Opp, Technical documentation manager

Signature

Preface

Dear Sir or Madam

With your decision to purchase this ultra pure water system from the **Smart2Pure** series, you have selected a high-quality product.

Thank you for the confidence you have placed in us.

Before you start to install and operate your ultra pure water system, please carefully read the information that is given in these operating instructions on how it is to be properly installed and operated.

This is particularly important, as we, the manufacturer, cannot accept liability for any damage occurring as a result of improper operation of the system, or from use of it for other than the intended purpose.

Niederelbert, 15.04.2011

1. Contents

2. Explanatory notes on the operating instructions

EU Mark of Conformity

CSA - admission

Important operating and/or maintenance instructions! Read the operating instructions with due care.

Risk of electric shock! Electrical work on the system is only to be carried out by qualified personnel.

General information! Particularly important notes are marked with this information sign.

Protective conductor connection

Connect the power supply to an electrical socket with a protective connection.

The information provided in these operating instructions is only valid for the system which has the serial number which is to be entered on the front page.

Please enter the serial number* of your Smart2Pure system in the space provided on the front page.

* Read the serial number of your ultra pure water system from the type plate.

For quick and correct service, please include the following information on all inquiries and replacement parts orders which relate to your system:

- The serial number

- The article number

3. Transport and packaging

Each ultra pure water system is carefully checked and packed prior to dispatch, but damage could nevertheless still occur during shipment.

3.1 Examination on receipt

- Check the completeness of delivery against the delivery note.

Is the packaging damaged?

- Inspect the system for damage.

3.2 Complaints

If damage has occurred to the system during transport:

- Contact the post, railway or forwarding agent immediately*.
- Keep the packaging including the outer cardboard box (for possible inspection and return shipment).

3.3 Packaging and return shipment

Whenever possible, use the original cardboard box and packaging material.

Should these no longer be available:

- Pack the system in packing film and a strong cardboard box, protected against damage from shock.

*** The time limit for complaints is 6 days (after receipt of the goods). The right to claim for damages expires when this time has elapsed.**

4. Extent of delivery

The following versions of the Smart2Pure ultra pure water system series are available. Each of these versions is optionally available with a performance of 3 l/h or of 6 l/h:

50129869	Smart2Pure 3	(Standard system)
50129870	Smart2Pure 3 UF	(Standard system + Ultrafiltration module)
50129872	Smart2Pure 3 UV	(Standard system + UV-Photo-oxidation)
50129688	Smart2Pure 3 UV/UF	(Standard system + UV-Photo-oxidation + Ultrafiltration module
50129873	Smart2Pure 6	(Standard system)
50129874	Smart2Pure 6 UF	(Standard system + Ultrafiltration module)
50129885	Smart2Pure 6 UV	(Standard system + UV-Photo-oxidation)
50129887	Smart2Pure 6 UV/UF	(Standard system + UV-Photo-oxidation + Ultrafiltration module

(Please compare the article number of the version you ordered with the article number given on the delivery note)

1x Smart2Pure (according to version)		Article no. 50129xxx
together with an assembly kit consisting of:		
Pretreatment cartridge	for a 3 l/h system	Article no. 09.2003
	for a 6 l/h system	Article no. 09.2006
Filter cartridge		Article no. 09.1020
Sterile filter capsule, 0.2 µm		Article no. 09.1003
Sterile vent filter		Article no. 22.0091
Feedwater connecting kit, R 3/4“		Article no. 25.0071
Connecting hose, o.d. 1/4“, 6 m		Article no. 18.0137
Ball valve, dia. 1/4“		Article no. 15.0112
Tabletop power pack, 24 VDC		Article no. 50129629
Universal adapter		Article no. 21.1006
Universal holder		Article no. 21.1007
Connecting cord (rubber connector to nema plug connector)		Article no. 50132200
Connecting cord (rubber connector to british ST plug connector)		Article no. 50132203
Connecting cord (rubber connector to euro plug connector)		Article no. 50132215
Operating instructions		Article no. 50129848

5. Safety precautions

Observe these safety precautions for your own safety!

- Each system of the Smart2Pure series is a modern ultrapure through out water system, exclusively designed for the purification of tap water of drinking water quality.
- Please do not start to install and operate your system until you have read through the information given in these operating instructions.
- Please note that the manufacturer is freed from all liability when the system is used for other than the intended purpose and/or is improperly operated.
- Lifting and carrying the ultra pure water system, e.g. to the installation location, should be carried out by two people. To lift it, each takes hold of it under the base plate at two corners.
- The CE-mark is invalidated when constructional changes are made to the system or foreign products are installed in it.
- Protect the system from frost. The temperature at the installation area must be at least + 2°C.
- Observe all general rules and regulations that are valid at the installation location, including the current accident prevention regulations.
- The feedwater pressure must be min. 1 bar and max. 6 bar. An additional pressure reducer must be installed should it be higher.
- According to DIN EN 1717, water purification systems must be equipped with a device that safeguards the tap water against contamination.
- A suitable electric socket must be made available for the system (refer to Technical Specifications).
- The installation area must have a drain at floor level with at least DN 50 pipe and which allows free run off.
- When the system is to be wall-mounted, please previously check that the wall has a sufficient load-bearing capacity (refer to Technical Specifications for the weight).

- The maximum operating temperature of the system is 40°C.

- If neither a floor drain is not is available, then proceed as follows during longer system standstills (e.g. long holidays):
  → **Switch the system off (unplug the mains plug).**
  → **Shut off the supply of water to the ultra pure water system.**
  Do not re-start the system with the water supply still in the shut off condition, as the pump would then suffer damage. The manufacturer will not accept any liability should this occur.

- When installing the ultra pure water system, ensure that there is sufficient working room around it for problem-free operation of it as well as for filter replacement, checking connections etc.

- The guarantee is valid for a period of 12 months!

- Never look directly at a switched-on UV-lamp, because UV light endangers eyesight! Never switch the UV-lamp on when is has been taken out of the metal cylinder!

  Only authorized personnel are to carry out UV-lamp replacement.

6. Intended application

Continually increasing requirements on ultra pure water quality, ever stricter demands resulting from technological advances and increasingly lower detection limits in laboratories, together with the need for user-friendly systems and complete solutions, were decisive for the development of the novel Smart2Pure ultra pure water systems.

Smart2Pure systems have been specifically designed to produce sterile filtered ultra pure water which is free of particles, salts and organic compounds.

6.1 Application areas

- Analytical techniques in laboratories:

- HPLC (**H**igh **P**erformance **L**iquid **C**hromatography)
- IC (**I**on **C**hromatography)
- ICP (**I**nductive **C**oupled Argon **P**lasma)
- AAS (**A**tomic **A**bsorption **S**pectrophotometry)
- TOC analyzers (**T**otal **O**rganic **C**arbon)
- etc..

- Reagent and solution preparation:

- Cell culture media
- Tissue culture media
- Make up water for reagents used in on-line analytical systems

- Water for high-purity rinsing in laboratories

7. Technical specifications

Demands made on the feedwater	
Source	Drinking water acc. to DIN 2000.
Blocking index (SDI)	Max. < 3 for all versions. If the value is higher, a pre-filter must be installed upstream.
Free chlorine concentration	< 0.1 mg/l
Manganese content	< 0.05 mg/l
Iron content	< 0.05 mg/l
pH-Range	4 - 11
Temperature	2 - 35 °C
Pressure	1 - 6 bar

ASTM I Product water quality (at dispensing valve)					
		Standard	**UV**	**UF**	**UV/UF**
Conductivity	µS/cm	0.055	0.055	0.055	0.055
Resistance	MΩxcm at 25°C	18.2	18.2	18.2	18.2
TOC	ppb	5 - 10	1 - 5	5 - 10	1 - 5
Bacteria	CFU/ml	< 1	< 1	< 1	< 1
Bacterial endotoxines	EU/ml	--	--	< 0.005*	< 0.005*
Particles	> 0.2 µm	< 1/ml	< 1/ml	< 1/ml	< 1/ml
Flow rate	l/min	1.0	1.0	0.6	0.6
Typical amount dispensed		5 Litres per day			

* Dependent on feedwater quality and disinfection

ASTM II Product water quality (in the tank)					
		Standard	**UV**	**UF**	**UV/UF**
Conductivity	µS/cm	0.067 – 0.1	0.067 – 0.1	0.067 – 0.1	0.067 – 0.1
Resistance	MΩxcm at 25°C	10 – 15	10 – 15	10 – 15	10 – 15
Retention quota for bacteria and particles		Ø 99 %	Ø 99 %	Ø 99 %	Ø 99 %
Permeate performance	l/h	3 or 6	3 or 6	3 or 6	3 or 6
Tank content	l	approx. 6	approx. 6	approx. 6	approx. 6

Dimensions	
Height:	545 mm
Width:	305 mm
Depth:	400 mm
Weight: Smart2Pure Standard Smart2Pure UF Smart2Pure UV Smart2Pure UV/UF	 22 kg 22 kg 22 kg 22 kg

Airborne sound emission	
Sound-pressure level	49 db(A)

Water connections	
Feedwater	Hose, ¼“ o.d.
Concentrate	Hose, ¼“ o.d.
Tank water overflow	Hose, ¼“ o.d.
Pure water	Hose, ¼“ o.d.
Outlet/dispensing valve	Hose, 8 – 10 mm o.d.

Electrical connections / external switched mode power supply	
Input voltage	AC 100 – 240 V, 50 – 60 Hz, 5 – 3.8 A
Output voltage	DC 24 V, 3.8 A
System connection	DC 24 V, 80 W
Serial interface	RS 232
Potential-free contact	max. 30V, 2A
Protection Class	Class II (external SMPS certified as Class I)

Ambient conditions (DIN EN 61010-1 (VDE 0411-1):2011-02)	
Usage	Indoor rooms
Height	Up to 2000 m
Temperature range	From 5° C to 40° C
Relative humidity	Maximum relative humidity 80 % at temperatures of up to 31° C, linearly decreasing to 50 % relative humidity at 40° C
Line-voltage variation	Not more than ± 10 % of the line voltage
Transient overvoltages	As usually occur in the supply network (overvoltage category II acc. to IEC 60364-4-443). Note: The rated level of transient overvoltage is the withstand impulse voltage acc. to overvoltage category II of IEC 60364-4-443
Ventilation requirements	There are no special requirements with regard to ventilation.
Degree of pollution	2

Materials of parts that contact water	
Pump head	Nylon with glass fibre
UV-Lamp	High-purity quartz
UV Housing	Stainless steel
Filter cartridge	PP
UF Housing	Polycarbonate
Raw water solenoid valve	PA
Recirculation solenoid valve	PA
Rinsing solenoid valve	PA
Pressure hold valve	Brass, chemically nickel-plated
Dispensing valve	POM
Conductivity measuring cell	PVC, stainless steel
Connectors	POM
Hoses	PE
Gaskets	EPDM
RO-Membrane	PA

8. How Smart2Pure functions

Raw water solenoid valve V1 is closed during Stand-by and standstills to prevent a flow of raw water into the system when it is not in operation. It so protects external tank B1 from overflowing.

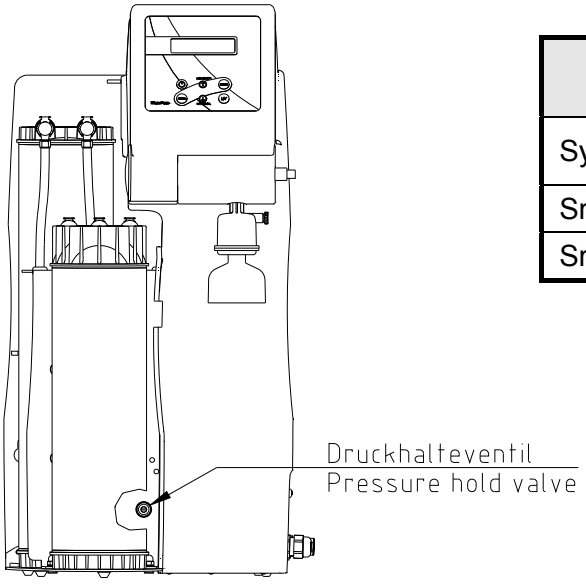
In normal operation, tap water at a maximum pressure of 6 bar flows into the system and is pumped by pressure booster pump P1 through the subsequent pretreatment F1 and reverse osmosis membrane F2. The latter retains all salts dissolved in the incoming water to the extent of the given retention quota and, because of the molecular size of the membrane pores, also retains up to Ø 99% of bacteria, pyrogens and particles.

The reverse osmosis permeate flows on through the downstream purification stages, such as UV-photooxidation UV1, the 185 nm and 254 nm wavelengths of which reduce organic compounds (only in Smart2Pure versions UV and UV/UF), filter cartridge F3 and ultrafilter F6 with automatic rinsing (only in Smart2Pure versions UF and UV/UF) to the tank.

The water constituents which were retained by the reverse osmosis membrane flow away in the concentrate that remains.
The special conductivity measuring probe QISA 300 (with temperature compensation) and temperature probe TISA 500 permanently monitor the conductivity and temperature of the ultra pure water and the values of these are shown in the display.

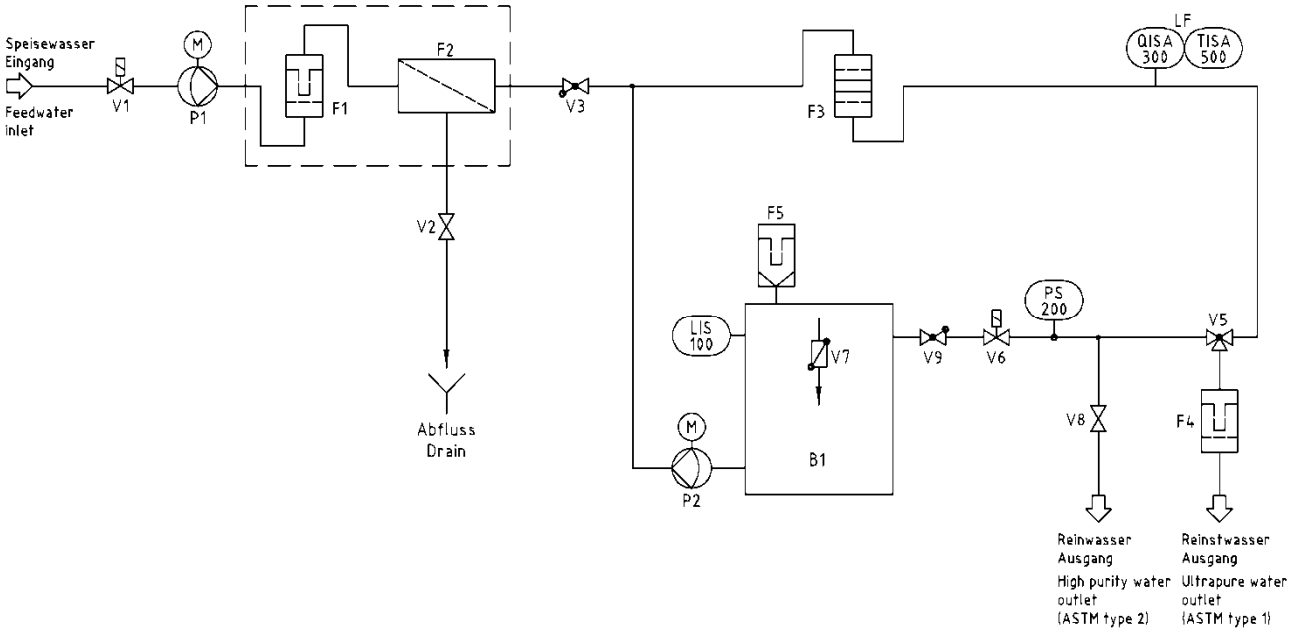
The water in the storage tank is re-circulated at regular intervals by recirculation pump P2 to ensure the constant high water quality. Float switch LIS 100 monitors the water level inside the tank.

Pressure hold valve V2 is factory adjusted. A change in this adjustment could lead to damage to the reverse osmosis membrane. Because of fluctuations in the temperature and pressure of the feedwater, however, *Service* or authorized personnel must carry out a check on the adjustment of it, as shown by the concentrate flow that is linked to it, and re-adjust it if necessary, after putting the system into operation and at regular intervals thereafter.



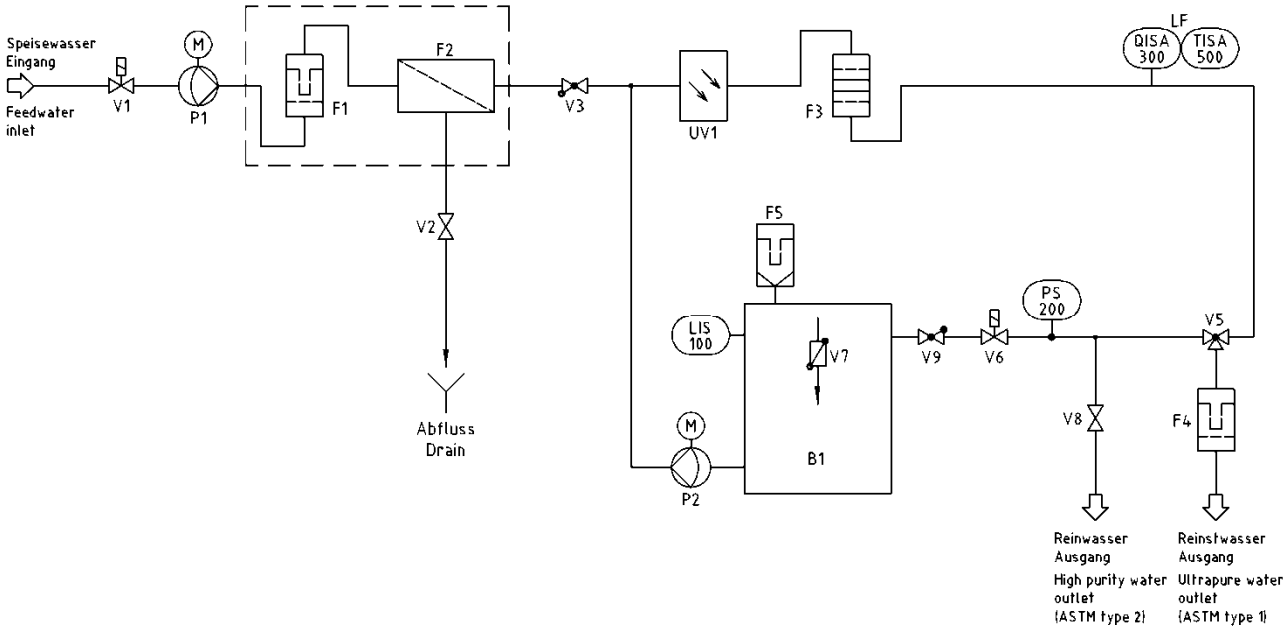
Concentrate flow for Smart2Pure to be checked/adjusted every 3 months		
System	Permeate flow [l/h]	Concentrate flow [l/h]
Smart2Pure 3	3	50
Smart2Pure 6	6	50

8.1 Flow chart, Smart2Pure Standard



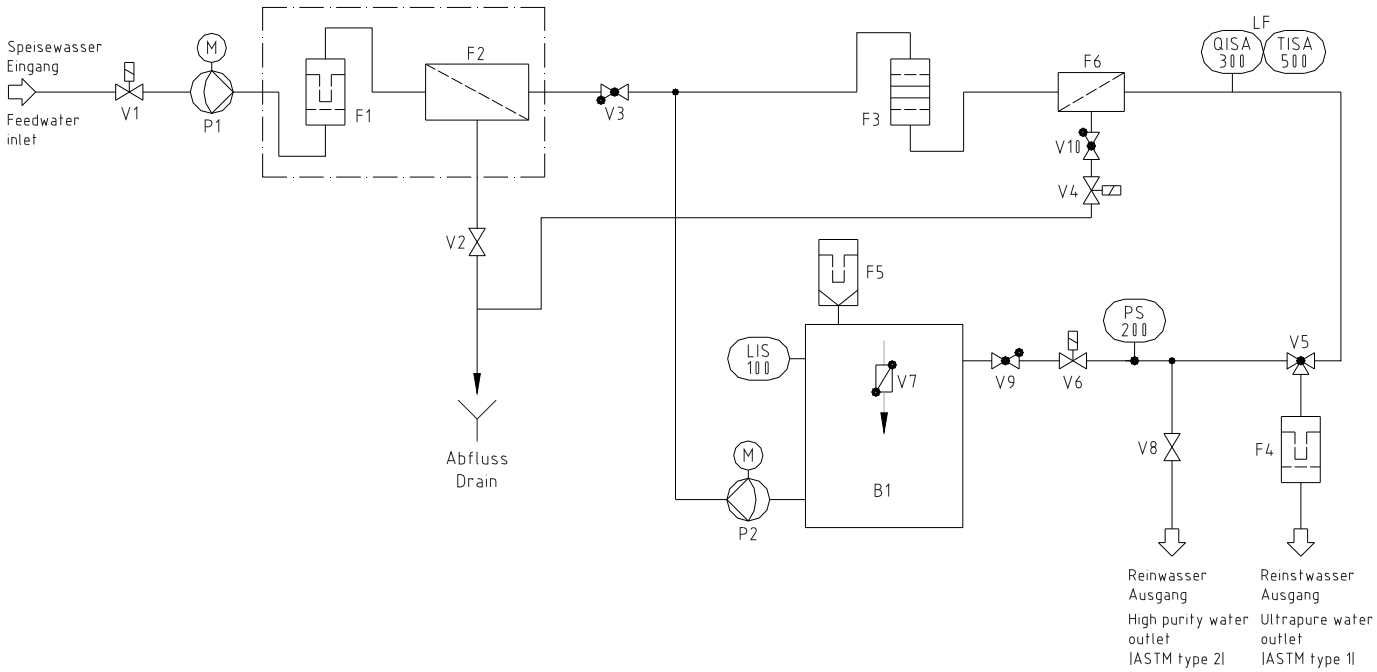
B1	Ultra pure water tank
F1	Pretreatment cartridge
F2	Reverse osmosis membrane
F3	Filter cartridge
F4	Sterile filter
F5	Sterile vent filter
LIS 100	Float switch
P1	Pressure booster pump
P2	Recirculation pump
PS 200	Pressure switch
QISA 300	Ultra pure water conductivity measuring cell
TISA 500	Temperature sensor
V1	Raw water solenoid valve
V2	Pressure hold valve
V3	Check valve
V5	Ultra pure water dispensing valve
V6	Recirculation solenoid valve
V7	Sterile overflow
V8	Pure water dispensing valve
V9	Check valve

8.2 Flow chart, Smart2Pure UV



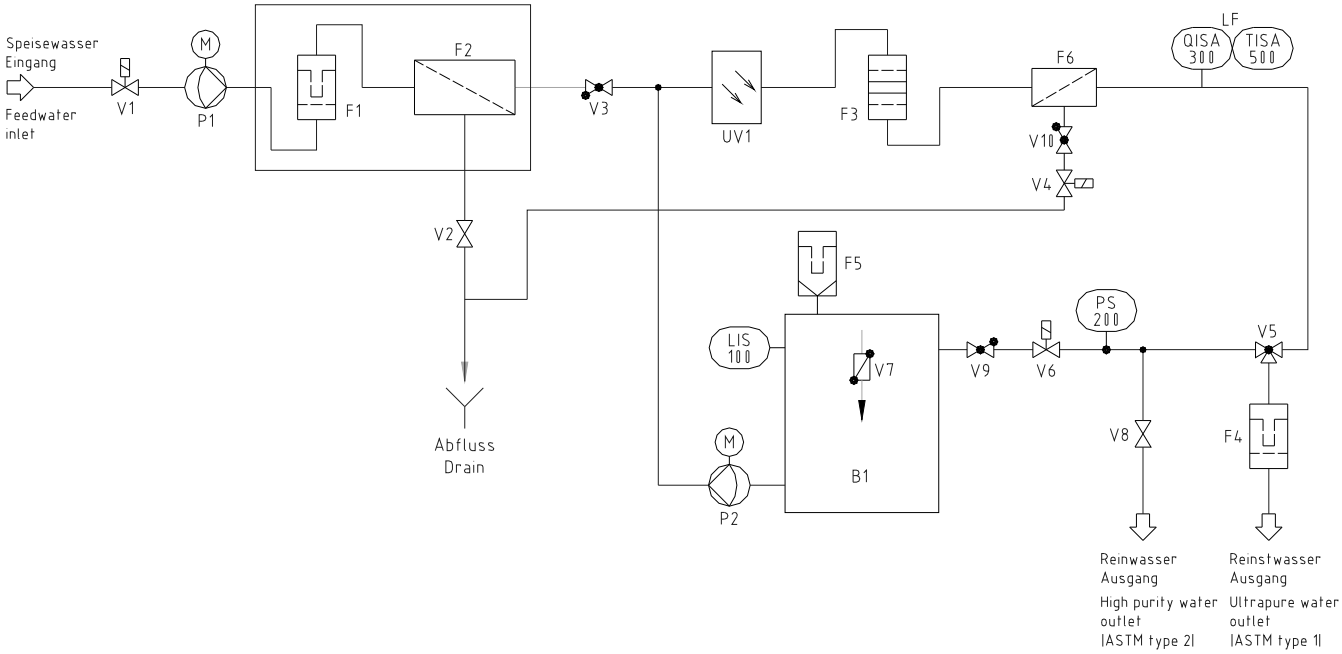
B1	Ultra pure water tank
F1	Pretreatment cartridge
F2	Reverse osmosis membrane
F3	Filter cartridge
F4	Sterile filter
F5	Sterile vent filter
LIS 100	Float switch
P1	Pressure booster pump
P2	Recirculation pump
PS 200	Pressure switch
QISA 300	Ultra pure water conductivity measuring cell
TISA 500	Temperature sensor
UV1	UV Photo-oxidation
V1	Raw water solenoid valve
V2	Pressure hold valve
V3	Check valve
V5	Ultra pure water dispensing valve
V6	Recirculation solenoid valve
V7	Sterile overflow
V8	Pure water dispensing valve
V9	Check valve

8.3 Flow chart, Smart2Pure UF



B1	Ultra pure water tank
F1	Pretreatment cartridge
F2	Reverse osmosis membrane
F3	Filter cartridge
F4	Sterile filter
F5	Sterile vent filter
F6	Ultrafiltration module
LIS 100	Float switch
P1	Pressure booster pump
P2	Recirculation pump
PS 200	Pressure switch
QISA 300	Ultra pure water conductivity measuring cell
TISA 500	Temperature sensor
V1	Raw water solenoid valve
V2	Pressure hold valve
V3	Check valve
V4	Rinsing solenoid valve
V5	Ultra pure water dispensing valve
V6	Recirculation solenoid valve
V7	Sterile overflow
V8	Pure water dispensing valve
V9	Check valve
V10	Check valve

8.4 Flow chart, Smart2Pure UV/UF



B1	Ultra pure water tank
F1	Pretreatment cartridge
F2	Reverse osmosis membrane
F3	Filter cartridge
F4	Sterile filter
F5	Sterile vent filter
F6	Ultrafiltration module
LIS 100	Float switch
P1	Pressure booster pump
P2	Recirculation pump
PS 200	Pressure switch
QISA 300	Ultra pure water conductivity measuring cell
TISA 500	Temperature sensor
UV1	UV Photo-oxidation
V1	Raw water solenoid valve
V2	Pressure hold valve
V3	Check valve
V4	Rinsing solenoid valve
V5	Ultra pure water dispensing valve
V6	Recirculation solenoid valve
V7	Sterile overflow
V8	Pure water dispensing valve
V9	Check valve
V10	Check valve

9. Installation of the system

9.1 Installation area

Consider the following requirements when selecting the installation area:

- Feedwater pressure minimum 1 bar, maximum 6 bar.

The feedwater pressure is not to exceed 6 bar. A pressure reducer must be installed if the pressure is higher.

- Minimum temperature + 2°C.
- Level standing surface.
- If the system is to be wall-mounted, the wall must be smooth. Please check that the wall has sufficient weight bearing capacity (system weight, Technical specifications).
- A DN 50 floor drain must be available.
- Free gravity flow to drain.

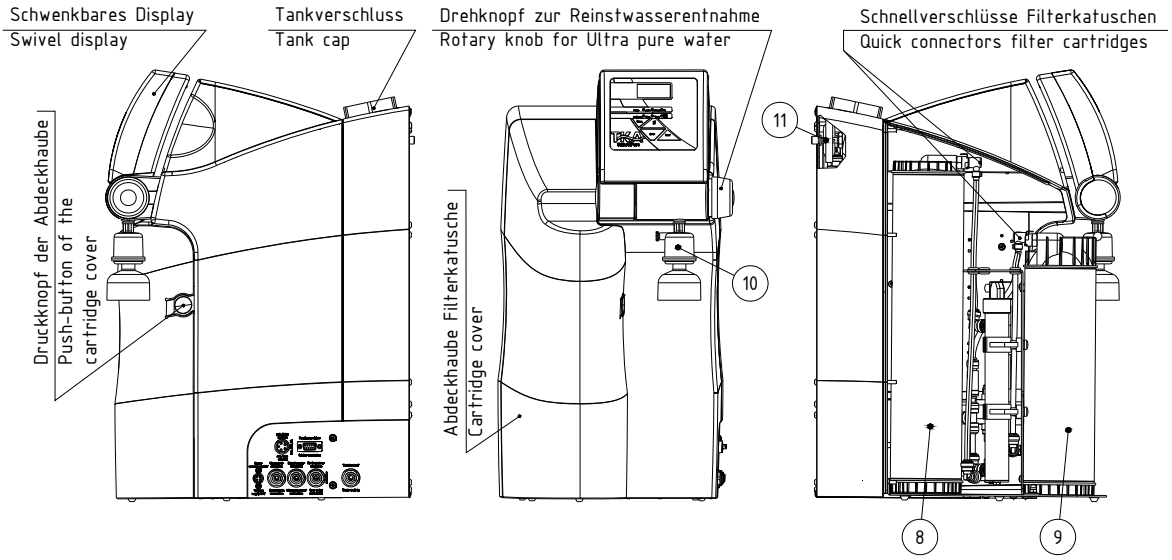
Free gravity fall to drain must be ensured!

- An electric socket with protective conductor must be available for connection of the system to the voltage supply (see Technical specifications).

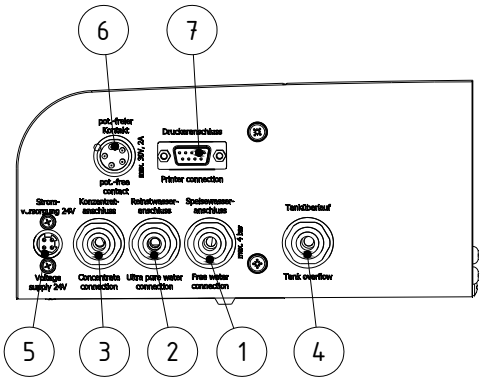
Position the system so that there is no difficulty in separating the device from the electric mains.

- There must be sufficient working space around the system (filter replacement etc.).
- The system must be easy to operate and check.
- An R 3/4" tap water connector is required.

9.2 Installation



11) Feedwater connector Hose, 1/4" o.d.
2) Pure water connector Hose, 1/4" o.d.
3) Concentrate connector Hose, 1/4" o.d.
4) Tank water return connector Hose, 1/4" o.d.
5) Power supply connector, 4-pin, 24V DC
6) Potential-free contact connector, 5-pin
7) Connector for optional printer
8) Filter cartridge
9) Pretreatment cartridge
10) Sterile filter
11) Sterile vent filter



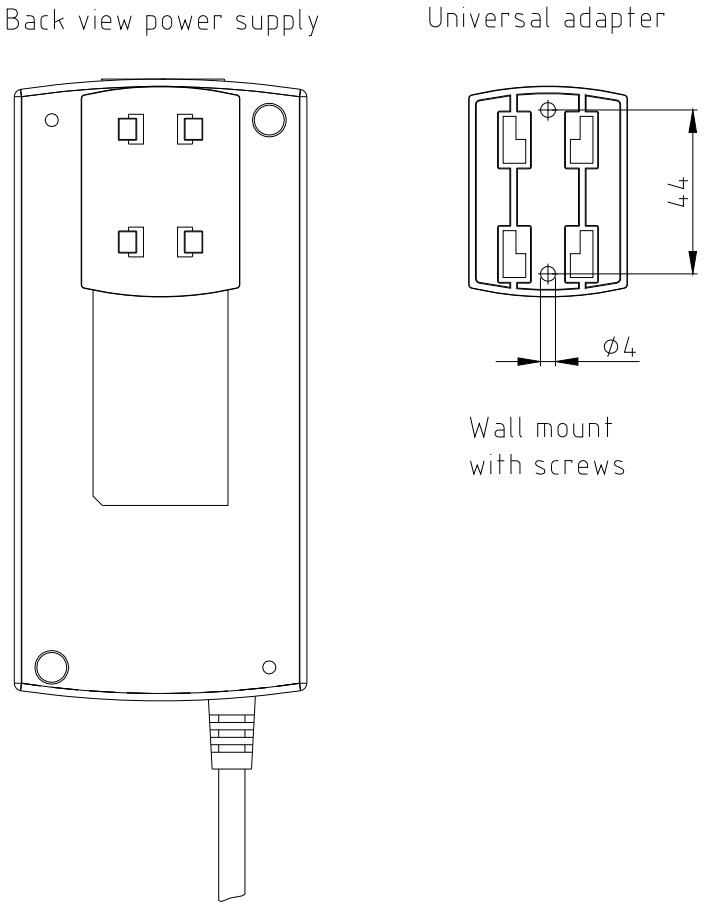
Proceed as follows to install your Smart2Pure ultra pure water system and put it into operation:

- Stand the system at the installation location or, if it is to be wall mounted, hang it to the wall using the wall holder that is available as accessory.
- Unlock the cartridge cover by pressing the push-button and take the cover off.
- Remove the stoppers from the filter cartridge and pretreatment cartridge which are supplied and keep the stoppers for return shipment.
- Fit the filter cartridge (8) in the free space at the back of the system and plug the 2 quick-connect couplings on the cartridge connectors so that they snap audibly into position.
- Now fit the pretreatment cartridge (9) in the free place at the front of the system and plug the 3 quick-connect couplings on the cartridge connectors so that they snap audibly into position.
- Use the R 3/4" assembly kit that is supplied to make connection to the feedwater connector (1).

Fit the dirt sieve that is provided in the assembly kit in the threaded feedwater hose connector before you fit this connector to a water tap that can be shut off.

- If the possibility of withdrawal of ASTM Type 2 pure water is required, use the stop cock which is supplied to make a 1/4" o.d. hose connection to the pure water connector (2).
- Use the 1/4" o.d. hose to make a free gravity fall connection from the system (connector 3 and 4) to a waste water drain.
- Screw the sterile vent filter (11) on the back of the system in the G 1/8" in the tank which is intended for it.
- Open the feedwater tap and check that no connections leak.
- Put the cartridge cover back on, making sure that the lock on the right side of the cover locks in place.

9.3 Mounting the power pack (voltage supply)



- Whenever possible, mount the power pack on the wall to the left or right of the ultra pure water system where it is freely accessible.
- Stick the universal holder which is supplied in the assembly kit to the back of the power pack as shown in the above Figure.
- Stick the universal adapter to a smooth wall surface or screw it to the wall using the dowels and screws supplied in the assembly kit.
- When the universal holder and universal adapter have been fitted, hang the power pack in.
- Plug the connecting cable (appliance cable) in the power pack socket.
- Connect the power pack to the ultra pure water system (4-pin power supply connector, pos. 6).
- The system is now ready for use.

10. Start-up

The system must have warmed up, or cooled down, to room temperature before start-up can be made.

Check that all hose connections have been correctly made as described in the "Installation" section.

Switch the system on by plugging the mains plug in a suitable electric socket with protective conductor.

After a brief self test the system begins to produce ultra pure water.

Wait until the first tank filling has been completed and discard this water. This could take approx. 1 or 2 hours according to the system type (6 or 3 l/h). Subsequently check the concentrate flow and adjust this as described in the "How Smart2Pure functions" section.

Withdraw at least 1 litre of water before you screw the sterile filter (10) that is supplied in the outlet of the dispensing valve.

Now set the wanted display mode, the limiting value for the conductivity and also the limiting value for the temperature as described in the “System control” section.

11. Brief operating instructions

The purity of the water produced is shown at the front of the system, either in µS/cm or in MΩxcm. Ultra pure water can be withdrawn from the dispensing valve at the front of the system.

Menu:

One press on the menu-key brings you to the first submenu, where you can select from the following choice:

1. Display of the water quality only in µS/cm
2. Alternatively, the display can show the water quality in µS/cm and the temperature one after the other at 2 second intervals (dual measuring mode)
3. Display of the water quality in MΩxcm (mono measuring mode)
4. Alternatively, the display can show the water quality and the temperature one after the other at 2 second intervals (dual measuring mode)

A second press on the menu-key brings you to the second menu, where you can set the limiting value for the conductivity of the ultra pure water (only in µS/cm)

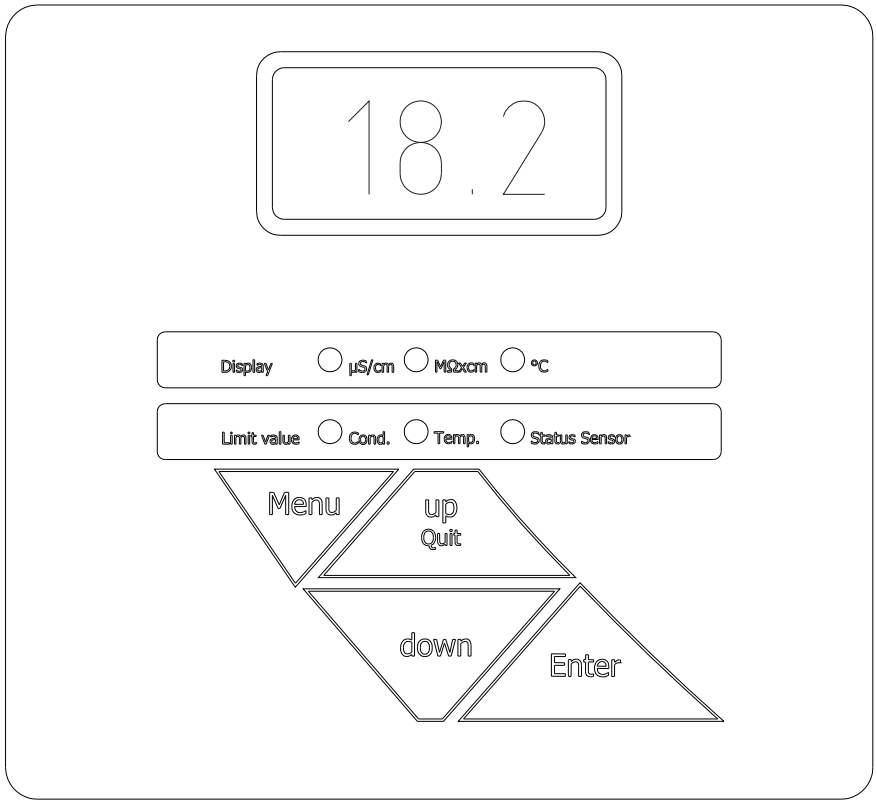
A third press on the menu-key brings you to the third menu, where you can set the limiting value for the temperature.

- When a limiting value is exceeded, this is signalled by a buzzer. The alarm signal can be switched off by a press on the quit/up button.

Leave your Smart2Pure ultra pure water system in operation even at weekends and during holiday times. Only then can the automatic recirculation effectively protect against increasing conductivity values in the storage tank.

When the Smart2Pure ultra pure water system is to be out of operation for longer than 72 hours, the ultra pure water inside the system will take up carbon dioxide and so will not be able to immediately produce ultra pure water of 18.2 MΩxcm quality. To prevent this, the filter cartridge should be prematurely replaced, whereby the storage tank must be emptied so that fresh ultra pure water flows through the system.

12. Operating elements



After switching on, all segments of the 7-segment display are shown for 3 seconds. During this time, the complete measurement cycle is run through and tested.

In the basic setting the display shows the conductivity in µS/cm. The display automatically carries out scaling in the range from 18.2 to 0.005 MΩxcm.

The measurement mode that the measuring device is in is shown via the upper LED row. The LED lights up green to show the appropriate unit, i.e. either µS/cm, MΩxcm or °C.

If a measurement range end value is exceeded (>199 µS/cm or >0.005 MΩxcm), then ÷200 appears in the display.

When there is an interruption between the system and sensors, the red LED "Status Sens." lights up and, instead of a measured value, "---" is shown in the display. The buzzer is additionally triggered when connection to the temperature sensor is interrupted.

Quit-button:

The buzzer that sounds when a fault occurs can be switched off with the Quit/UP-button. This acoustic message is again activated when the limiting value is gone below. The fault message is also given out via the potential free contact.

13. System control

13.1 Menu

The menu consists of three sub-points: Switching to dual mode together with selection of the measurement unit for the conductivity measurement. Setting the conductivity limiting value. Setting the temperature limiting value.

Mono / dual measurement mode:

Mono measurement mode:	In this mode only the conductivity is displayed. The temperature can be read as long as the Enter-key is pressed.
Dual measurement mode:	In this mode, temperature and conductivity are shown alternating in a 2-second takt. The LED for the unit switches with the display.

A single press on the menu-key brings the measurement mode that has last been set to display. Use the up- or down-key to switch between the permanent conductivity display and the alternating conductivity/temperature display. The display shows "**c**" for conductivity or "**ct**" for conductivity/temperature.
Switching between the measurement units µS/cm or MΩxcm can also be made here. The unit selected must be confirmed with Enter. The corresponding LED indicates which unit is operative.

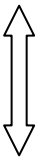
The following combinations are hereby possible:

ct / MΩxcm

c / MΩxcm

ct / µS/cm

c / µS/cm



up/down

13.2 Setting the limiting value for the conductivity

Setting range: 0.055 - 30 µS/cm
Basic setting: off

Important note: The limiting value can only be entered in µS/cm.

Two presses on the menu-key (the red "Cond." LED lights up) enable the limiting value for the conductivity to be set. Use the up- and down-keys to make the setting. The particular position that is to be changed can be selected with the Enter-key and is shown flashing in the display. When the wanted value has been reached, it must be confirmed with Enter.
Should a value of 30.1 µS/cm be set, then the word OFF appears in the display and limiting value evaluation is switched off.
If the limiting value of the conductivity is exceeded (Limit value Conductivity), the red "Cond." LED lights up and the buzzer sounds to signal a fault. The fault message can be given out via the optional printer.

13.3 Setting the limiting value for temperature

Setting range: 10 - 40°C
Basic setting: 35°C

Three presses on the menu-key (the red "Temp" LED lights up) enables the limiting value for the temperature to be set. Use the up- and down-keys to make the setting. The particular position that is to be changed can be selected with the Enter-key and is shown flashing in the display.
When the wanted value has been reached, this must be confirmed with Enter.
Should a value of 41°C be set, then the word OFF appears in the display and limiting value evaluation is switched off.
When the limiting value of the temperature is exceeded (Limit value Temperature), then the red "Temp" LED lights up and the buzzer additionally signals it. The fault message can be given out via the optional printer.

13.4 Communication

A printer can be connected to the RS 232 interface for the print out of measured values. The interface works at a transmission rate of 9600 bits/sec., 8 data bits, 1 stop bit and no parity.
The resistance in MΩxcm and the temperature in °C are given out at the serial interface separated by a comma. The conductivity is automatically scaled to three significant places. Output is made 1x per hour.
When the system is in operation, a press on the down-key triggers a measured value output at the serial interface.

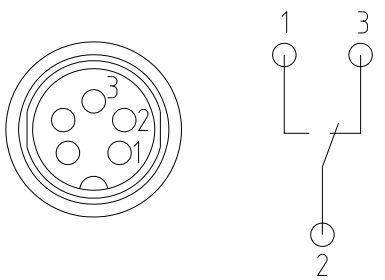
Print out:

e.g.: 18.2 MΩxcm, 23.4 °C

The SUB-D socket has the following pin assignment: PIN 2: RXD
PIN 3: TXD
PIN 5: GND

13.5 Potential-free contact

The system is equipped with a potential-free contact for the control of external equipment.
Max. connected load: 30V, 2A.
The PIN assignment of the 5-pin socket is as follows:



14. Maintenance

Regular maintenance of your system ensures that the value of it is maintained. We recommend that you close a service contract with a service company which has been expressly authorized. You then have the certainty of a high operational safety and reliability.

NOTE!

To ensure that system will work reliably for a long time, it must be checked, serviced and cared for at regular time intervals in accordance with these operating instructions!
For this reason, the operating instructions must be readily available to operating and maintenance staff at all times, and be carefully followed!

Any maintenance work which should become necessary during the validity of the guarantee is only to be carried out by an expressly authorized service company.

The operating-staff assigned is committed to carry out the weekly checks.
During the agreed term of validity of the guarantee, the maintenance record sheet supplied in the operating instructions should be properly kept by entry of the results of weekly checks.

CAUTION!

For perfect functioning to be ensured, the ultrafiltration membrane should be replaced every 2 years, or as soon as a drop in performance is determined.

Cleaning and disinfection of your system is performed for reasons of hygiene and has no effect on the technical condition of the system. The system must be cleaned and disinfected at least once yearly.

Control and maintenance work on electrical systems is only to be carried out when the system has been switched to a currentless condition at the mains and the switching off has been secured against inadvertent switching back on. Such work is only to be performed by appropriately trained, skilled electricians.

14.1 Maintenance intervals

Consumable materials are to be replaced at the intervals given in the following Table or when there is a drop in performance:

Material	Flow chart no.	Article no.	Interval*
Pretreatment cartridge	F1,F2	09.2003/09.2006	12 Months
Filter cartridge	F3	09.1020	12 Months
Sterilefiltercapsule	F4	09.1003	12 Months
Ultrafiltration membrane	F6	50133981	24 Months

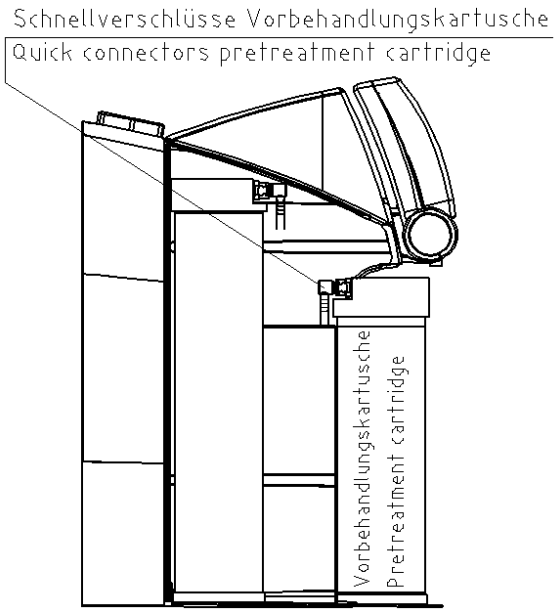
* Please keep in mind that the life of your consumables is directly dependent on the quality of the feed water and the amount of water used daily. The interval is contingent on the feedwater quality so that a shorter one may be necessary.

14.2 Replacing the pretreatment cartridge

The pretreatment cartridge must be replaced when operation of the system with insufficient preconditioning has led to module blockage and a corresponding drop in the stated capacity.

Proceed as follows to replace the pretreatment cartridge:

1. Empty the storage tank.
2. Separate the system from the mains by unplugging the mains plug.
3. Shut off the supply of feedwater.
4. Open the dispensing valve and close it when water no longer flows out.
5. Take the cartridge cover off.
6. Remove the three quick-connectors from the pretreatment cartridge and close the connectors of it with the stoppers that have been saved.
7. Draw the spent pretreatment cartridge out from the guide and replace it with the new pretreatment cartridge.
8. Remove the stoppers from the new pretreatment cartridge and save them.
9. Fit the quick-connectors on the pretreatment cartridge so that they audibly click into position.
10. Re-open the supply of feedwater.
11. Connect the system to the mains and check the plug connections for leakage.
12. Replace the cartridge cover.
13. Discard the first tank filling.



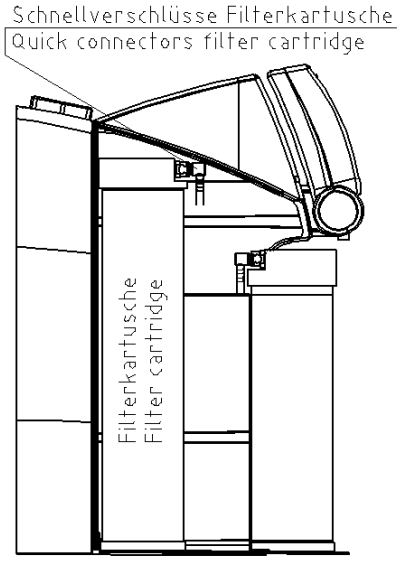
14.3 Replacing the filter cartridge

The filter cartridge must be replaced as soon as the maximum limiting value that is set for the ultra pure water is exceeded, and also after every disinfection of the system.

Proceed as follows to replace the filter cartridge:

1. Empty the storage tank.
2. Separate the system from the mains by unplugging the mains plug.
3. Shut off the supply of feedwater.
4. Open the dispensing valve and close it when water no longer flows out.
5. Take the cartridge cover off.
6. Remove the two quick-connectors from the feedwater side and the ultra pure water side of the filter cartridge and close the cartridge connectors with the stoppers that have been saved.
7. Draw the spent filter cartridge out from the guide and replace it with the new filter cartridge.
8. Remove the stoppers from the new filter cartridge and save them.
9. Fit the quick-connectors on the filter cartridge so that they audibly click into position.
10. Re-open the supply of feedwater.
11. Connect the system to the mains and check the plug connections for leakage.
12. Replace the cartridge cover.
13. Discard the first tank filling.

Only use filter cartridges of article number 09.1020 in this system, as this type of cartridge is specifically designed for it. Use of any other type invalidates the warranty.



14.4 Disinfection

Your system should be cleaned and disinfected at least once a year to eliminate any bacteria that are possibly in the system. We recommend that you carry out cleaning and disinfection shortly before the time that the filter cartridge must to be replaced.

Use cleaning solutions as follows:
MICRO-Chlor Granulate, 1 box, article no. 09.2202 (Europe only)
Cleaning Solution, 1 syringe, article no. CMX 25 (US-market only).

Please observe the information given in the safety data sheet supplied with Micro-Chlor disinfectant to avoid possible health hazards!

Proceed as follows to disinfect your system:

1. Disconnect the Smart2Pure from mains supply.
2. Open the lid of the storage tank, pour the contents of a box respectively a syringe of cleaning solution into the water-filled tank and then close the lid.
3. Connect the system with mains supply and let it run for 1 hour in normal operation to effective bacteria killing.
4. Discard two tank fillings of water.
5. Close the dispensing valve, disconnect the system from mains supply.
6. Change the filter cartridge as described in the Operating Instructions supplied with the system an if necessary the pre-treatment filter and the sterile filter.
7. Connect the system with mains supply.
8. Fill the tank completely once and discard the water produced from this tank filling.

Before dispensing water from the system, let water run out for approx. 15 minutes. The system is then ready for use.

15. Waste disposal

When the packaging is no longer needed it can be disposed of as household waste.

Systems are in conformity with EEC Guideline 2002/95/EC

The system is not to be thrown away as household waste but must be properly disposed of. It can be returned to the manufacturer for safe disposal according to EEC Guideline 2002/96/EC. We therefore request our customers in Germany and other member States in the European Economic Area to contact our local service centre or our headquarters:

Thermo Electron LED GmbH
Stockland 3
D-56412 Niederelbert, Germany

WEEE-Reg.-no.: DE 12471402

In countries outside of the European Economic Area, please contact your local authorities or waste disposal company.

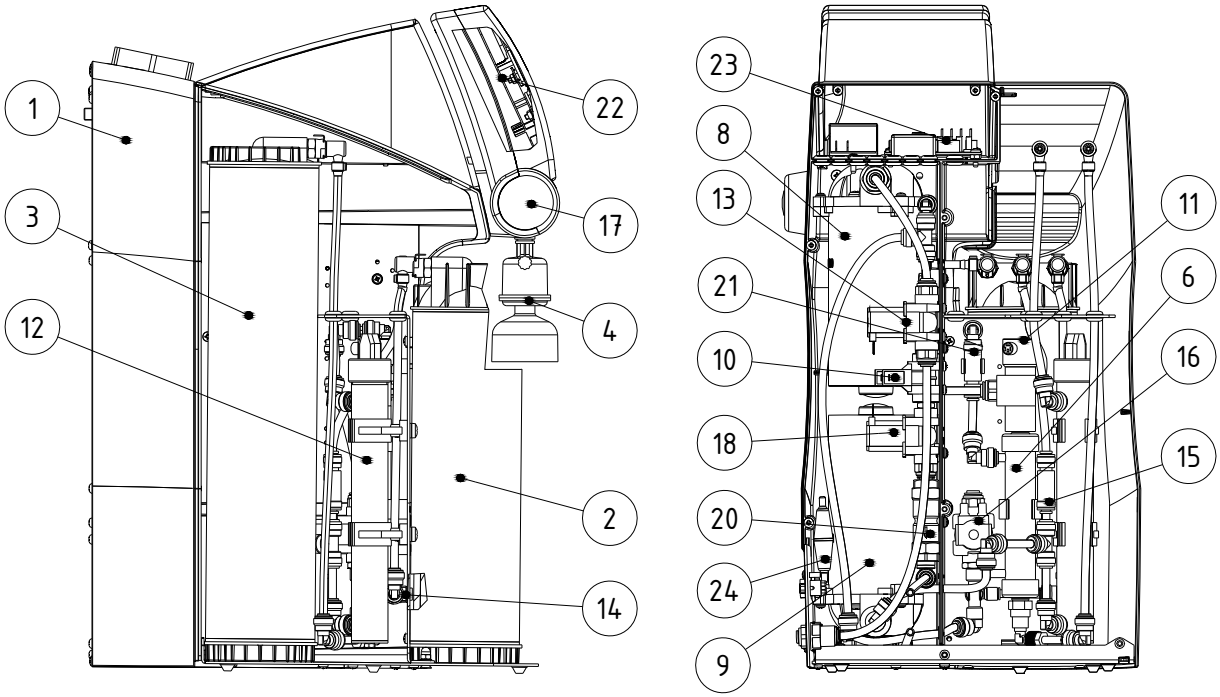
16. Trouble shooting

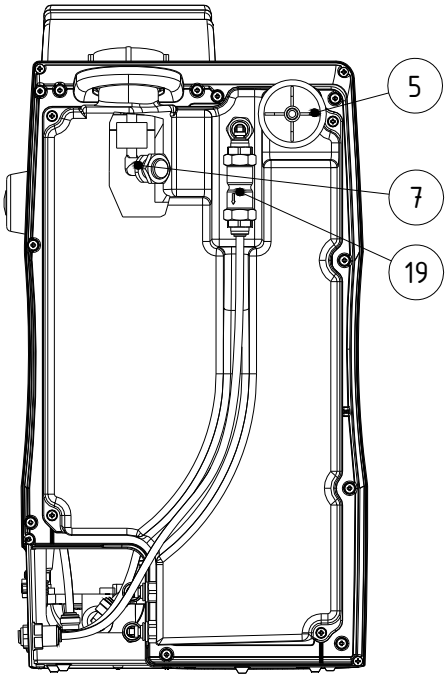
Fault	Cause	Remedy
System does not start	- No supply of current - Power pack or system control defect	- Supply current - Replace the power pack or system control
Water cannot be dispensed	- Feedwater supply is off - The feedwater and rinse water connectors are mixed up - Feedwater pressure < 1 bar	- Open the feedwater tap - Reverse the connections - Increase feedwater pressure
Resistance < 18.2 MΩxcm	- The system has a UF-module (higher conductivity possible) - Air in the UF-module because of empty tank - Spent exchanger capacity	- Wait until the tank is again filled and a rinse is triggered - Insert new filter cartridge
System control no longer reacts but LED‘s light up	- Improper operation - Voltage fault	- Unplug the mains plug for 5 seconds
Water leaks out	- Leaky hose connection - Feedwater pressure > 6 bar - Component defect (e.g. UV-quartz tube)	- Check and seal the hose connection - Install an upstream pressure reducer - Replace the component
Volume that can be dispensed is too small	- UF-Module blocked - Sterile filter blocked - Air in the sterile filter - Tank is not yet sufficiently filled	- Replace the UF-module - Replace the sterile filter - Vent the sterile filter - Wait until the tank is full

Fault message: Red LED is lit up *"Limit value Cond."*	- Spent filter cartridge - Limiting value set too low The system is equipped with a UF-module (higher conductivity is possible)	- Replace with new filter cartridge (art. no.: 09.1006) - Check, match the limiting value setting
Fault message: Red LED is lit up *"Limit value Temp."*	- Temperature in the system is too high - Limiting value is set too low - Feedwater temperature too high	- Reduce temperature by letting water flow out - Check and match the limiting value setting - Reduce the feedwater temperature
Fault message: Red LED is lit up *"Status Sens."* Anzeige im Display *"---"*	- Interruption in cable to the conductivity measuring cell - Measuring cell defect	- Check the cable and the plug connection. - Replace the measuring cell
Fault message: Red LED is lit up *"Status Sens."* The display shows *"---"*, and buzzer simultaneously sounds an acoustic message	- Interruption in cable to the conductivity measuring cell - Temperature sensor defect	- Check the cable and the plug connection. - Replace the measuring cell

17. Replacement parts and consumable materials

Rückansicht ohne Tank
Back side without tank





Pos.	R+I no.	Designation	Article no.
1	B1	Ultra pure water tank	17.0136
2	F1 F2	Pretreatment cartridge consisting of prefilter / hardness stabilizer and RO membrane: for 3 l/h performance for 6 l/h performance	 09.2003 09.2006
3	F3	Filter cartridge	09.1020
4	F4	Sterile filter	09.1003
5	F5	Sterile vent filter	22.0091
6	F6	Ultrafiltration module	50133981
7	LIS 100	Float switch	50133991
8	P1	Pressure booster pump	19.0050*
9	P2	Recirculation pump	19.0050*
10	PS 200	Pressure switch	50133982*
11	QISA 300 TISA 500	Ultra pure water conductivity measuring cell Temperature sensor	50133994
12	UV 1	Replacement UV-lamp UV-Booster	09.1002 22.0088
13	V1	Raw water solenoid valve	15.0062*
14	V2	Pressure hold valve	15.0113
15	V3	Check valve	15.0114
16	V4	Rinsing solenoid valve	15.0062*
17	V5	Ultra pure water dispensing valve	50133988
18	V6	Recirculation solenoid valve	15.0062*
19	V7	Sterile overflow	15.0009
20	V9	Check valve	15.0019
21	V10	Check valve	15.0114
22		Board with display	16.0351
23		System control board	16.0337
24		Fuse holder for glas tube fuse 5 x 20mm Glas tube fuse 5 x 20mm, 3,15 A, slow fuse	50133979 50131758
25		Tabletop power pack	50129629

* Wear part

We ask for your understanding that the guarantee we give becomes invalidated when replacement parts, accessories or consumables from other manufacturers are used in this system, as we have no influence on their appropriateness or their quality.

18. Accessories

Designation	Article no.
Disinfection agent, MICRO-Chlor (pack of 12 cans, Europe only)	09.2202
Cleaning Solution, 1 syringe (US-market only)	CMX25
Printer	09.2207
Wall holder	09.2212

The address to contact when your system requires service:

Overview of Thermo Scientific International Sales Organization
Postal address USA:
Thermo Scientific
275 Aiken Road
Asheville, NC 28804
USA

Enquiries from USA/Canada
Sales: +1 866 984 3766
Service: +1 800 438 4851

Enquiries from Latin America
Sales: +1 866 984 3766
Service: +1 866 984 3766

Enquiries from Asia
China
Sales: +86 10 8419 3588
Service: Toll free 8008105118
Support Mobile 4006505118 or +86 10 8419 3588

India
Sales: +91 22 6716 2200
Service: Toll free 1 800 22 8374 or +91 22 6716 2200

Japan
Sales: +81 45 453 9220
Service: +81 45 453 9224

Enquiries from the Rest of Asia/Australia/New Zealand
Sales: +852 2885 4613
Service: +65 6872 9720

Enquiries from Countries not listed / Rest of EMEA
Sales: +49 6184 90 6940 or +33 2 2803 2000
Service: +49 6184 90 6940

Enquiries from Europe
Austria
Sales: +43 1 801 40 0
Service: +43 1 801 40 0

Belgium
Sales: +32 53 73 4241
Service: +32 53 73 4241

Finland / Nordic / Baltic countries
Sales: +358 9 329 100
Service: +358 9 329 100

France
Sales: +33 2 2803 2180
Service: +33 825 800 119

Germany:
Postal Address Germany:
Thermo Electron LED GmbH
Robert-Bosch-Straße 1
D - 63505 Langenselbold

Phone
Sales: Toll free 0800 1 536 376
or +49 6184 90 6940
Service: Toll free 0800 1 112110
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E-Mail: info.labequipment.de@thermoftsher.com

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Service: +39 02 95059 250

Netherlands
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Service: +31 76 579 5639

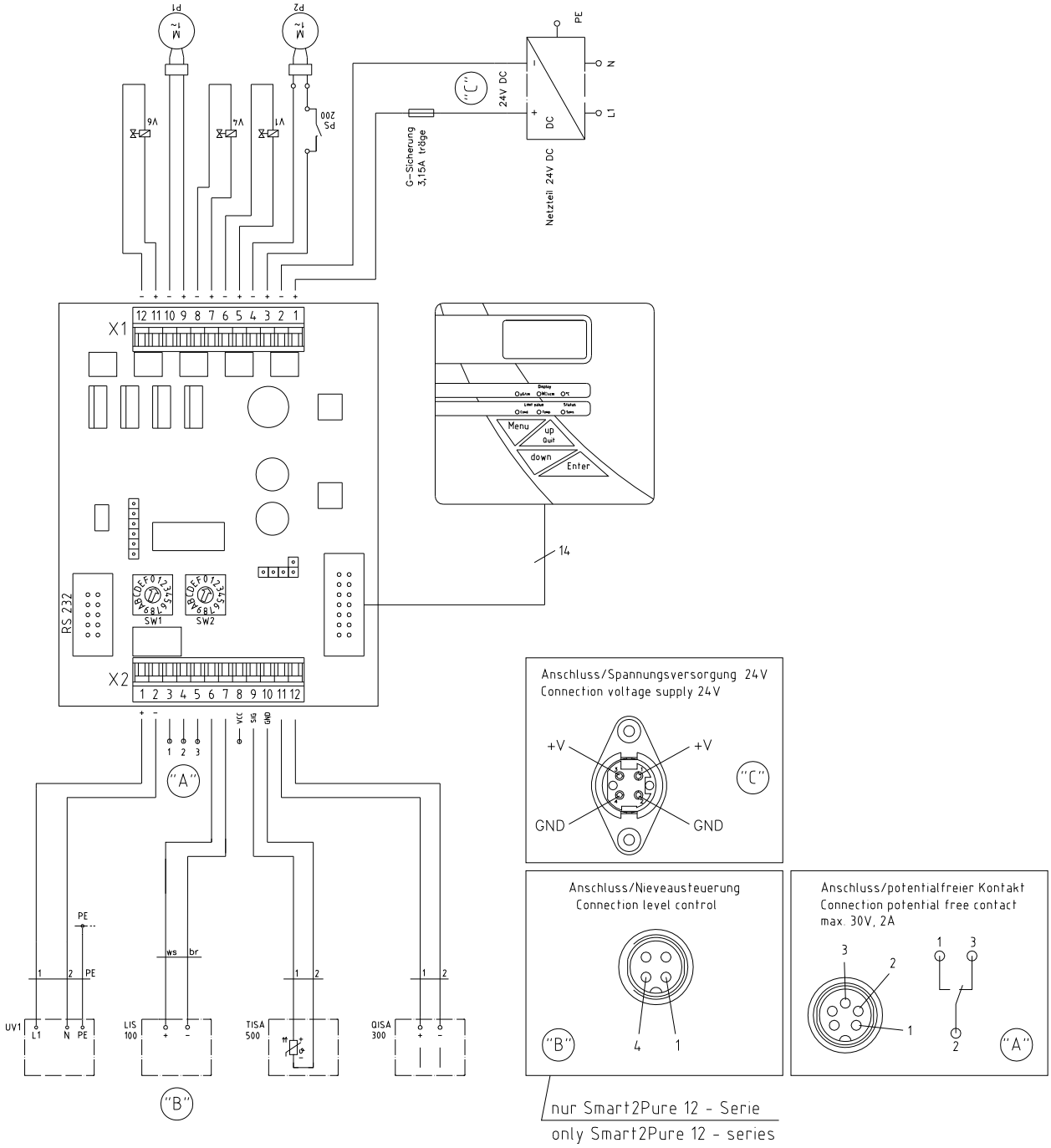
Russa / CIS
Sales: +7 812 703 4215
Service: +7 812 703 4215

Spain / Portugal
Sales: +34 93 223 0918
Service: +34 93 223 0918

Switzerland
Sales: +41 44 454 1212
Service: +41 44 454 1212

UK / Ireland
Service: +44 870 609 9203
Sales: +44 870 609 9203

19. Terminal assignment



X 1	1, 2	Spannungsversorgung 24V
	3,4	Rezirkulationspumpe (P2), Druckschalter (PS200)
	5,6	Rohwasser-Magnetventil (V1)
	7,8	Spülmagnetventil (V4)
	9,10	Druckerhöhungspumpe (P1)
	11,12	Rezirkulations-Magnetventil (V6)
X 2	1,2	UV-Fotooxidation (UV1)
	3	Pot. freier Kontakt
	4	Pot. freier Kontakt
	5	Pot. freier Kontakt
	6,7	Niveau Kontakt (LIS100)
	8 (VCC)	
	9 (SIG)	Temperatursensor (TISA500)
	10 (GND)	Temperatursensor (TISA500)
	11,12	Leitfähigkeitsmesszelle Reinstwasser (QISA300)

X 1	1, 2	Power supply 24V
	3,4	Recirculation pump (P2), Pressure switch (PS200)
	5,6	Rawwater solenoid valve (V1)
	7,8	Rinsing solenoid valve (V4)
	9,10	Booster pump (P1)
	11,12	Recirculation solenoid valve (V6)
X 2	1,2	UV-fotooxidation (UV1)
	3	Pot. free contact
	4	Pot. free contact
	5	Pot. free contact
	6,7	Level contact (LIS100)
	8 (VCC)	
	9 (SIG)	Temperature sensor (TISA500)
	10 (GND)	Temperature sensor (TISA500)
	11,12	Conductivity measuring cell (QISA300)

20. Maintenance record

(Please keep this carefully updated, as correct keeping of this maintenance record is a condition of the guarantee)

Customer address: **Location:**

_____ _____ **Type of system:** _____

_____ _____ **Serial no.:** _____

_____ _____ **Year made:** _____

Date	Resistance, ultra pure water [MΩxcm]	Temperature, ultra pure water [°C]	Flow rate of ultra pure water ASTM Type I [L/min]	Resistance, permeate [MΩxcm]	Flow rate of permeate [L/h]	Flow rate of concentrate [L/h]

Pretreatment cartridge replaced yes/no	Filter cartridge replaced yes/no	Cleaning, disinfection yes/no	Remarks	Signature

Each false entry is considered to be a falsification of documents.

The following times are to be observed to assure the quality of the system:

- 1x weekly, record measured values
- 1x yearly, replace the pretreatment cartridge
- 1x yearly, replace the filter cartridge

Contact Information Thermo Scientific

North America:
USA/Canada +1 866 984 3766 (866-9-THERMO)

Europe:
Austria +43 1 801 40 0, Belgium +32 53 73 42 41, France +33 2 2803 2180,
Germany national toll free 08001-536 376,
Germany international +49 6184 90 6940, Italy +39 02 95059 448,
Netherlands +31 76 579 55 55, Nordic/Baltic/CIS countries +358 9 329 10200,
Russia +7 812 703 42 15, Spain/Portugal +34 93 223 09 18,
Switzerland +41 44 454 12 12, UK/Ireland +44 870 609 9203

Asia:
Australia +61 39757 4300, China +86 21 6865 4588 or +86 10 8419 3588,
India toll free 1800 22 8374, India +91 22 6716 2200,
Japan +81 45 453 9220, New Zealand +64 9 980 6700,
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Countries not listed: +49 6184 90 6940